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R E P O R T

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# Promoting International Energy Security

## Volume 2, Turkey and the Caspian

Andrew S. Weiss, F. Stephen Larrabee,  
James T. Bartis, Camille A. Sawak

Prepared for the United States Air Force

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## Preface

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The dramatic rise in oil prices in 2008 has increased attention on the sources of imported oil, the workings of the world oil market, and the potential problems of meeting future demand for liquid fuels. Energy security concerns often focus on the Middle East, mainly because that is where surplus oil production capacity is concentrated. But most of the world's oil and natural gas production occurs in countries outside that area. Political instability, governance shortfalls, armed conflict, and the potential for further conflict both within and outside the Middle East continue to threaten the continuity of supplies of oil and natural gas.

Oil and natural gas exports already provide the financial foundation for the economic development of Azerbaijan, Kazakhstan, and Turkmenistan, and there is considerable promise of significant expansion of exports in coming years and decades. Presently, energy exports from the Caspian region are constrained by a combination of inadequate upstream investment and the available pipeline network. Meanwhile, Russia, the European Union, China, Turkey, and the United States have major stakes in how and when additional oil and gas production will come on line and, more importantly, how it will be routed to oil and gas importing nations. Turkey is emerging as an “energy crossroads” because of its unique position astride potential transit routes from the Caspian, as well as from Iraq and Iran, to Europe.

In this technical report, we examine the current energy security situation in the Caspian region and the potential impediments to further development of Caspian oil and natural gas resources. Considering Turkey's important relationship with the United States and the U.S. Air Force (USAF), we give special attention to issues associated with the transit of oil and natural gas within Turkey, including oil tanker transit through the Bosphorus and the security of Turkey's overland oil and gas pipeline network. The report also suggests areas in which USAF might be able to assist Turkey in attaining its objective of becoming an energy transit hub.

This report is the second of a four-volume series examining USAF roles in promoting international energy security. The research was sponsored by the Office of Operational Planning, Policy and Strategy, Deputy Chief of Staff for Operations, Plans, and Requirements, Headquarters USAF, and was undertaken within the Strategy and Doctrine Program of RAND Project AIR FORCE as part of a fiscal year 2010 study “Air Force Roles in Promoting International Energy Security.”

The other three volumes in this series are

- James T. Bartis, *Promoting International Energy Security*, Vol. 1: *Understanding Potential Air Force Roles*, Santa Monica, Calif.: RAND Corporation, TR-1144/1-AF, 2012.

- Ryan Henry, Christine Osowski, Peter Chalk, and James T. Bartis, *Promoting International Energy Security*, Vol. 3: *Sea-Lanes to Asia*, Santa Monica, Calif.: RAND Corporation, TR-1144/3-AF, 2012.
- Stuart E. Johnson, Caroline Baxter, James T. Bartis, and Duncan Long, *Promoting International Energy Security*, Vol. 4: *The Gulf of Guinea*, Santa Monica, Calif.: RAND Corporation, TR-1144/4-AF, forthcoming.

The first volume of this series provides an overview of the world oil market and its implications for Air Force planning. Readers interested in the topic of energy security may also find the following RAND reports to be of interest:

- *Imported Oil and U.S. National Security* (Crane et al., 2009).
- *Troubled Partnership: U.S.-Turkish Relations in an Era of Global Geopolitical Change* (Larrabee, 2010)
- *Alternative Fuels for Military Applications* (Bartis and Van Bibber, 2011).

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## Summary

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### Energy Prospects of the Caspian Region

With its sizeable crude oil and natural gas reserves, the Caspian region is poised to become an important energy supplier to European and global markets. The Caspian's proven energy reserves are estimated at 48 billion barrels of oil and 13 trillion cubic meters of natural gas. Azerbaijan and Kazakhstan hold the region's largest reserves of crude oil and are now major petroleum exporters in their own right. The region's crude production and export levels are expected to significantly expand in coming years and could double by 2035. Turkmenistan and Azerbaijan hold roughly three-quarters of the Caspian's proven natural gas reserves. Competition over the development of the Caspian's largely untapped natural gas reserves and control over future export routes remains intense. Several competing pipeline projects are at various stages of development for bringing natural gas from the Caspian to Europe, Turkey, and China.

Caspian gas reserves are widely seen as a possible means of lessening Europe's current dependence on natural gas imports from Russia, and the region could play a role in promoting European energy security by helping various European Union member countries diversify energy sources. Spurred in part by interruptions in Russian gas supplies to Europe in 2006 and 2009, the United States and the European Union have supported the development of a new transit corridor for Caspian gas that would be routed through Turkey. Russia, a dominant player in supplying European energy markets, has been decidedly hostile to proposed pipeline routes that do not fall under its direct control.

### Turkey's Role in Caspian Energy Development

Turkey aspires to become a key transit state for the transport of oil and gas from the Caspian region and the broader Middle East destined for European and world markets. At the heart of Ankara's energy policy is a fast growing economy with extremely high levels of dependence on energy imports and a government intent on strengthening Turkey's position as a regional power. Over the past two decades, Turkey has experienced a dramatic surge in energy consumption, most of which has been satisfied by imports from Russia, Azerbaijan, and Iraq. Predictable and close relations with these suppliers will be important for Turkey's ability to maintain its economic vitality.

Turkey's relations with the United States are currently in flux. The disappearance of the Soviet threat has eroded the original rationale underlying the U.S.-Turkish security partnership. The importance Turkey's leaders ascribe to U.S. foreign policy goals has fallen. Concerns

the United States raises now have less weight in Turkey's decisions about national security issues. At the same time, the collapse of the Soviet Union has opened up new vistas and opportunities that were previously off limits to Turkish foreign policy, particularly in the Middle East, the Caucasus, and Central Asia. This shift in Turkey's security environment, rather than an embrace of anti-Americanism or anti-Western Islamic ideals, is the main driving force behind current Turkish foreign policy. Today, most of Turkey's biggest security challenges lie in the Caucasus and Middle East, particularly in Iraq and Iran. Hence, of necessity, Turkey is increasing its attention on these areas.

## Potential Challenges and Threats

Competition for the Caspian's large energy resources is unfolding on several levels, drawing in a variety of outside players. Russia is seeking control over export routes for Caspian oil and gas resources for its own commercial and political ends. Natural gas sales to Europe are an important source of income. Russia has often treated energy as a political instrument to gain leverage over the behavior and policies of producer countries and consumers alike and has consistently sought to strengthen its involvement in the development of energy resources located in Azerbaijan, Turkmenistan, and Kazakhstan. These efforts are particularly visible in its attempts to curb the development of a new southern gas corridor, such as undermining the construction of the Nabucco Pipeline, which would transport Caspian gas to European markets through Turkey, thereby bypassing Russia.

China is emerging as an important regional player in the Caspian area, a trend that is likely to deepen in keeping with Beijing's broad-ranging attempts to secure long-term access to raw materials and energy resources around the world. Thanks to its willingness to employ government resources on behalf of these efforts, China has been able to rapidly complete a number of major oil and gas pipelines. China's growing involvement in the Caspian is not inherently problematic from an energy security standpoint because it has helped expand total global crude and natural gas supplies while breaking Russia's near monopoly over the routing of oil and gas exports from Caspian producer countries, namely, Kazakhstan and Turkmenistan.

The countries in the Caspian region and Turkey face significant security threats to infrastructure and transportation routes that could interrupt energy flows from the region. First, the crowded and narrow Bosphorus waterway remains vulnerable, posing a chronic and sensitive challenge for Turkish authorities. A terrorist attack or tanker accident leading to the long-term closure of the Bosphorus would have severe political, economic, and environmental implications, especially for Turkey. Second, the Kurdish Workers' Party has repeatedly conducted terrorist attacks against oil and gas pipelines inside Turkey, raising doubts about Turkey's ability to protect energy infrastructure located on its territory. (Similar attacks have occurred frequently in northern Iraq.) Third, long-running regional conflicts, particularly over the enclave of Nagorno-Karabakh and the breakaway Georgian regions of Abkhazia and South Ossetia, have the potential to interrupt energy flows from the Caspian in the future.

## Findings and Potential U.S. Air Force Roles

### Limited Scope for Expanding USAF-Led Security Cooperation with Caspian Energy Producers

This report examines the major energy security challenges that Caspian producer countries and Turkey face, with an eye toward identifying possible roles for USAF in this region. We see relatively little scope for USAF to increase its engagement with Caspian energy producers on energy security issues. For the foreseeable future, we expect that USAF relationships with counterparts in these countries will be dominated by the need to preserve transit routes, especially to Afghanistan. Given the delicate balance the Caspian countries seek to maintain among the region's leading powers—Russia, China, Turkey, and Iran—there also are inherent limitations on the readiness of Caspian energy producers to increase security cooperation with the United States. As a result, opportunities for bilateral cooperation are likely to remain focused on such activities as border control, maritime security, and emergency response. Azerbaijan is a potential exception, given its desire to deepen security ties with the United States. However, efforts to expand security cooperation with Baku will be severely limited by long-standing congressional restrictions on aid to the Azerbaijani military; these restrictions are likely to remain in place in the absence of any diplomatic breakthrough on resolving the Nagorno-Karabakh conflict.

### Energy Security Promising for USAF Engagement with Turkey

Although recent changes in Turkey's foreign policy orientation have caused some strains in the U.S.-Turkey relationship, Turkey remains an important ally. U.S.-Turkish cooperation on energy security issues offers a promising yet modest opportunity to strengthen the bilateral relationship. Energy security is likely to grow in importance for Turkey's leaders in the future. At present, U.S.-Turkish military cooperation on energy security issues is largely confined to informal senior leader and staff-level dialogues. This is largely due to the fact that energy security is not a primary mission of the Turkish armed forces but rather a role assigned to the Jandarma, a paramilitary force that is subordinated jointly to the Ministry of Defense and Ministry of Interior. The scope for potential U.S.-Turkish energy cooperation is also likely to be constrained by Turkey's traditional sensitivity about respect for its sovereignty.

Still, extensive U.S.-Turkish military and intelligence cooperation on reducing the Kurdish Workers' Party terrorist threat in Northern Iraq has created an important set of relationships between the USAF and its Turkish military counterparts. These relationships could provide a foundation for expanded dialogue and eventual collaborative efforts on energy security. Reducing vulnerabilities in the Bosphorus is another area in which U.S. disaster response capabilities and the lessons learned from the Deepwater Horizon disaster in the Gulf of Mexico could prove useful for helping Turkish civilian and military leaders plan emergency responses and develop disaster scenarios.





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## Abbreviations

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bpd	barrels per day
bcm	billion cubic meters
BOTAS	Boru Hatlari ile Petrol Tasima A.S., Turkey's state-owned pipeline corporation
BTC	Baku-Tbilisi-Ceyhan [oil pipeline]
CPC	Caspian Pipeline Consortium
DoD	Department of Defense
EU	European Union
IEA	International Energy Agency
IED	improvised explosive device
ITG	Turkey-Greece Interconnector
ITGI	Turkey-Greece-Italy Interconnector
LNG	liquefied natural gas
NATO	North Atlantic Treaty Organization
OPEC	Organization of Petroleum Exporting Countries
PAF	Project AIR FORCE
PKK	Kurdish Workers' Party, also known as the People's Congress of Kurdistan or Kongra-Gel (KGK)
tcm	trillion cubic meters
USAF	U.S. Air Force



## Prologue

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This volume reports on exploratory research undertaken as part of broader study directed at energy security and how it affects U.S. Air Force (USAF) planning. That broader study examined the world oil market, how developments in that market might affect “wholesale” supplies of jet fuel, and what measures the Air Force might take to protect itself against high fuel prices and supply disruptions, as documented in Bartis, 2012. To better examine the potential role of the Air Force in promoting international energy security, we conducted three exploratory studies. The first, documented here, addresses the Caspian and Turkey. The second addresses the sea-lanes from Hormuz to Asia and is documented in Henry et al., 2012. The last focuses on the Gulf of Guinea and is documented in Johnson et al., forthcoming. This prologue presents an overall summary of the findings of the broader study on energy security, so that readers will be able to place the current volume in that context.

### The World Oil Market

Global demand for liquid fuels is about 87 million barrels per day (bpd). Presently, over 98 percent of this demand is met by petroleum products derived from crude oil and, to a much smaller degree, liquid hydrocarbons that are coproduced with natural gas. Over half of global crude oil production enters the international oil trade.

As is the case with many other commodities, oil prices are subject to large variations. For petroleum, price volatility is especially pronounced for three reasons:

1. It takes a fairly long time to bring new production online in response to price signals—generally at least six years and often much longer.
2. Once new production is brought online, the marginal costs of continuing production are fairly low.
3. Over the short term, petroleum demand is fairly unresponsive to prices.

These three factors account for the persistent high petroleum prices during most of the 1970s and early 1980s and the 17 years of low prices beginning in 1985. The low petroleum prices during the late 1980s and 1990s resulted in what, in retrospect, turned out to be an underinvestment in new petroleum production, leading to historically high crude oil prices during 2007 and 2008.

Complicating this structural picture of the world petroleum market are two major institutional problems. The first is the existence of an international oil cartel, the Organization of Petroleum Exporting Countries (OPEC). OPEC has a strong interest in keeping world crude

oil prices high and reducing price volatility. The history of oil prices since 1973, however, shows that OPEC has had mixed success with both objectives. In fact, the net result of OPEC's existence may be increased crude oil price volatility, since OPEC's attempts to maintain high oil prices, when prices are already high, tend to promote additional investment in new oil production in nations, including some members of OPEC, that do not conform to OPEC's production quotas.

The second institutional problem stems from the location of the world's petroleum resources. While most of the world's conventional petroleum resources are located in nations astride the Persian Gulf, there are also appreciable resources in many other locations. But nearly all the major oil exporting nations outside the Persian Gulf, and a few inside, suffer from governance problems that seriously impede investment in additional productive capacity. The notable exceptions are Canada and Norway. By presenting a barrier to investment in petroleum (and natural gas) production, governance shortfalls have made world oil prices more volatile and higher than they would otherwise be. For example, considering just two countries—Iraq and Nigeria—continuing conflict is keeping daily production millions of barrels below what their combined resource base is able to support. In most of the other important oil exporting countries, governance shortfalls center on corruption, the lack of the rule of law, and persistent violations of human rights.

## **Responding to the Market**

The first volume of this series examines the measures that the Air Force, and more broadly, the U.S. Department of Defense (DoD), can take in response to the structural and institutional conditions that characterize the world petroleum market. While DoD is one of the world's largest fuel users, its consumption of about 340,000 bpd is a small fraction (less than 0.5 percent) of global petroleum demand. Considering that U.S. domestic petroleum production is about 7.5 million bpd, and that an additional 3 million bpd of secure supplies are imported from Canada and Mexico, we can find no credible scenario in which the military would be unable to access the 340,000 bpd of fuel that it needs to defend the nation.

While DoD and the services will have access to the wholesale fuel supplies that they require, the price for those supplies may be high. As fuel consumers, DoD and the services have only one effective option for dealing with high petroleum prices: reducing overall petroleum fuel use. This can be accomplished by purchasing equipment and adopting maneuver schemes that are more energy efficient and, in the short term, by implementing energy conservation measures to reduce petroleum use. We also found that alternative fuels do not offer DoD a way to appreciably reduce fuel costs.

## **Promoting Energy Security**

USAF plays an important and productive role in the world oil market, not as a consumer but rather as one of the armed services of the United States. The armed services are the backbone of the U.S. national security policy that ensures access to the energy supplies of the Persian Gulf and the stability and security of key friendly states in the region. Moreover, the U.S. Navy, by

its global presence, ensures freedom of passage in the sea-lanes that are crucial to international trade in petroleum and natural gas.

Can more be done? Is there a productive role for the Air Force in further promoting energy security? To answer these questions, we conducted three exploratory studies focusing on (1) Nigeria and other potential oil exporting countries in the Gulf of Guinea, (2) the Caspian oil and gas exporting nations and Turkey, and (3) the sea-lanes from Hormuz to Asia. We purposely selected topic areas outside of the Middle East because the U.S. military is already active in the Persian Gulf and the Strait of Hormuz. Additionally, energy security issues within the Middle East have been well studied.

The analyses reported in the three volumes of exploratory studies led us to conclude that there is a role for the Air Force but that important caveats apply. In nations where security shortfalls impede hydrocarbon production or transport, current and future USAF capabilities in building partnership capacity offer security improvements that could promote greater production of petroleum and natural gas resources. Notable examples of nations where security shortfalls are significantly impeding investment and production are Nigeria and Iraq. While we did not examine the situation in Iraq, our review of opportunities to build partnership capacity in Nigeria and other nations bordering the Gulf of Guinea suggests that any efforts to build military partnerships in this region must consider broader U.S. goals, especially the risks that U.S.-provided military capabilities might be applied to local civilian populations. While there are signs of improved governance in Nigeria, these considerations suggest that Ghana may be a more attractive partner.

In examining the Caspian Region, the major energy supply challenge for current and future energy flows stems from the region's need for significant upstream investment, the lack of a well-developed export infrastructure, and Russia's desire to determine how the region's energy resources are developed. Although the Russian invasion of Georgia in 2008 did not directly target energy infrastructure, most export routes for oil and natural gas from Azerbaijan to Turkey were interrupted for several weeks because of the combination of precautionary shutdowns and an apparent sabotage attack inside Turkey. With regard to the remaining nations in the Caspian region, we found that direct threats to the security of the energy infrastructure are being fairly well addressed, especially considering the current low threat level.

Turkey appears as a special case because of its geostrategic location, status as a North Atlantic Treaty Organization (NATO) member, and long-time relationship with USAF. Kurdish terrorists have been able to execute numerous successful attacks on oil pipelines traversing eastern Turkey. The pace of attacks against energy-related targets will cause investors to weigh pipeline security risks when considering the large investments that will be required if Turkey is to realize its goal of becoming an energy hub between Europe and both the Caspian and the Middle East. Another important Turkish energy transit issue is the oil tanker traffic through the Bosphorus Strait. From the Turkish perspective, concerns center on limiting heavy tanker traffic and transit delays in the Bosphorus and coping with the potential damage from a major oil spill. From the oil industry perspective, transit security concerns center on a terrorist attack or navigation accident that might block tanker passage for many months. Considering its state of development and military capabilities, Turkey certainly has the wherewithal to address pipeline attacks and the concerns regarding the Bosphorus. However, USAF could play a productive, albeit limited, role in promoting technology transfer and best practices on infrastructure protection, with the main motivation being the strengthening the U.S. and USAF relationship with Turkey.



Another potential role for USAF is in assisting the U.S. Navy in sea-lane protection, which is the subject of the third volume of this series of technical reports. Asia's sea lines of communication are a growing security concern because of the increasing dependence of rapidly expanding Asian economies on imported energy sources—oil and natural gas. Unfortunately, regional security mechanisms have not kept pace and are no longer commensurate with the rise in the region's significance.

On this topic, our first major finding is that a joint approach, in which USAF provides meaningful assistance to the Navy, offers a more efficient and effective application of U.S. defense assets. By capitalizing on USAF-Navy interdependencies, a joint approach would lay a foundation for addressing more-strategic concerns, including the overall USAF role in assuring access to the global commons, and the collaborative development of an interdependent force posture. Our second, and more significant, finding is that overall U.S. interests are best served by a multinational approach to the protection of the energy sea-lanes to Asia. This approach provides a much better mechanism for addressing potentially serious threats that might arise if one or more of the countries along the sea-lane fails or goes rogue. Additionally, multinational cooperation in sea lines of communication protection provides a means of dampening the lingering tensions and simmering disputes that prevail within Asia. From the USAF perspective, a multinational approach provides new opportunities for interaction, building partnerships, and assuring access.

## Introduction

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The Caspian region boasts some of the world's largest natural gas and crude oil reserves. Since the collapse of the Soviet Union in 1991, the landlocked region has become a major target for energy exploration and production. However, inadequate upstream investment and export infrastructure are keeping output below its full potential and limiting access to world markets. Russia is attempting to restrict how Caspian energy resources are developed and transported to world markets. Yet Russia's grip has loosened over time as such countries as Azerbaijan and Kazakhstan pursue aggressive energy development and pipeline projects led by firms from China, the European Union (EU), Turkey, and the United States. As the next phase of development of the Caspian's oil and gas reserves gets under way, its success will depend on the ability of Caspian energy producing countries and the energy industry to balance their own aspirations with those of key outside actors.

U.S. interests and engagement in the region since September 11, 2001, have centered on its proximity to Afghanistan and the need for coalition overflight, basing, and transit rights in support of military operations in Afghanistan. On a strategic level, the region's energy resources have been widely seen since the early 1990s as an important tool for bolstering producer countries' sovereignty, independence, and control over their economic destinies. As a major energy consuming country, the United States stands to benefit from diversification of global energy supplies, which helps lower energy prices and strengthens energy security. Repeated cutoffs of Russian gas supplies to Ukraine and other countries have strengthened views in various European capitals that Caspian energy resources might help meet Europe's energy security needs, either by supplementing or supplanting supplies from other producers. Although Russia's disputes with transit states have often been driven by commercial concerns (as opposed to the Kremlin's broader foreign policy objectives), the damage to Russia's image as a reliable supplier has helped bolster U.S. and EU support for a creation of a new transit corridor for Caspian gas through Turkey that would bypass both Russia and Iran.

Between the Caspian basin and Europe sits Turkey, a crucial U.S. ally that aspires to a leading role in bringing Caspian energy, especially natural gas, to European and world markets. It is hard to overstate the strategic importance of U.S. relations with Turkey, which, located between Europe, the Middle East, the Balkans, and the Caucasus, is emerging as a regional power in its own right. The United States has thrown its support behind Turkey's aspirations in the energy realm, recognizing that a major Turkish role as an energy transit state would help strengthen Ankara's economic and political ties to Europe. Washington and Ankara worked closely in the 1990s and 2000s to promote the successful completion of the Baku-Tbilisi-Ceyhan (BTC) oil pipeline and the South Caucasus natural gas pipeline from Azerbaijan, both of which terminate in Turkey.

Turkey's ambition to become a major energy transit state is motivated by energy security challenges of its own. Turkey's fast-growing economy has become extremely dependent on oil and gas imports, which now account for nearly all Turkish energy consumption. This import dependence lies at the heart of both Turkey's close ties with Russia, its main energy supplier, and its desire for reliable access to oil and gas from the Caspian basin and, over the longer term, Middle Eastern countries, such as Egypt, Iran, Iraq, and Qatar.

With its EU membership hopes on hold, Turkey is increasingly focused on security challenges and economic opportunities in the greater Middle East. This ongoing reorientation is creating considerable geopolitical tensions, as illustrated by the recent rupture in Turkish-Israeli relations and the negative effects of Turkey's "no" vote on United Nations Security Council Resolution 1929 on Iran's nuclear program. The disappearance of the monolithic Soviet threat that once bound the United States and Turkey tightly together reduces the incentive for Turkey to be responsive to U.S. foreign policy and national security concerns. Energy security may prove to be an important exception to this dynamic, and this introductory chapter will explore how U.S.-Turkish cooperation on energy security might help bolster the overall U.S.-Turkish relationship.

Current U.S. diplomatic and political engagement on energy security in the Caspian region reflects four main goals:

1. encouraging the development of new oil and gas resources
2. supporting the economic and political independence of Caspian countries
3. supporting Europe's desire for energy security
4. bolstering the development of new energy transportation options for Caspian energy producers (Morningstar, 2009).

In stressing the importance of diversity of energy supplies, U.S. policy is based on the expectation that increased supplies of oil and gas from the Caspian will strengthen global energy security. As the Obama administration's Special Envoy of the U.S. Secretary of State for Eurasian Energy, Ambassador Richard Morningstar, has aptly put it, there is little chance that a single molecule of natural gas from the Caspian will ever be consumed inside the United States, but the availability of such gas on world markets will be inherently beneficial for global supply (Morningstar, 2010a).

The U.S. policy framework explicitly endorses Turkey's desire to become a key transit state for energy from the Caspian and Middle East. It also emphasizes that competition for energy resources in the Caspian is not a zero-sum game and that China's growing appetite for Caspian and Russian energy will not necessarily harm U.S. or European energy security (Morningstar, 2010b). The administration backs the creation of a new southern corridor to European markets for Caspian natural gas but has not singled out any proposed energy project as its preferred option. This is a clear change of emphasis from the previous administration's focus on megaprojects, such as the Nabucco Pipeline for natural gas and the Trans-Caspian pipelines for oil and gas. While expressing continued U.S. support for the politically visible yet commercially troubled Nabucco project, Morningstar and other senior administration officials have been careful to indicate that the U.S. administration views more modest options as equally compelling, including the Turkey-Greece-Italy Interconnector and the Trans-Adriatic Pipeline (Morningstar, 2009, 2010a).

Several factors are likely to drive energy security in the Caspian region and Turkey over the near to medium term. First and foremost is the pace at which oil and gas reserves can be developed and brought to world markets. Success in this effort depends primarily on the commercial viability of specific projects and access to investment resources and advanced recovery technology. The latter two elements are heavily concentrated in the hands of international oil companies whose interest in Caspian projects has been strong historically.

Energy transit routes from the Caspian region are still at a relatively early stage of development. Given the existence of competing, Russian-controlled routes, it is unclear whether ambitious projects like the Nabucco Pipeline will ever be built. Potential bottlenecks and security challenges for energy transit from the Caspian abound, ranging from the danger of oil spills and other accidents in the crowded and narrow Bosphorus Strait to attacks by Kurdish Workers' Party (PKK) terrorists on oil and gas pipelines inside Turkey.<sup>1</sup> Smoldering regional conflicts over the Armenian enclave of Nagorno-Karabakh and the breakaway Georgian regions of Abkhazia and South Ossetia have the potential to disrupt energy transit in the future. A long-running dispute over the division of the Caspian seabed among the five littoral states has slowed exploration efforts and blocked construction of pipelines that would transit the southern portion of the Caspian Sea.

This report examines potential roles for USAF in promoting energy security with the Caspian countries and Turkey. It assesses problems and threats that might impede energy flows or interfere with the successful development of these resources. The volume also examines major issues that will bear on Turkey's ability to become an important energy crossroads. Given the critical importance of Turkey for core U.S. national security interests in the Middle East, this chapter discusses possible USAF roles in U.S.-Turkish energy security-related cooperation and assesses whether such joint activities can benefit the overall relationship.

Chapter Two surveys the current status of energy development in the Caspian region, with particular focus on the three countries with appreciable energy export potential: Azerbaijan, Kazakhstan, and Turkmenistan. It also provides an overview of ongoing efforts to create a new network of export pipelines from the Caspian to major markets in Europe and Asia and assesses the implications of Turkey's growing domestic energy needs for its ambitions to become a major energy crossroads. Chapter Three evaluates the key issues and challenges that will shape future energy development, transit, and security in the Caspian basin and Turkey. We then briefly examine, in turn, Europe's energy security challenges, Turkey's growing role in the region, Russia's crucial role as an energy supplier and regional power, and China's rapidly expanding influence. In Chapter Four, we survey the array of threats facing energy production and transit. Chapter Five analyzes and assesses current U.S. government policies and initiatives on energy security in the region. Finally, in Chapter Six, we identify and discuss potential USAF efforts that could contribute to energy security in the Caspian and provide tangible support for Turkey's objectives and aspirations in this realm.

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<sup>1</sup> This organization is now also known as the People's Congress of Kurdistan or Kongra-Gel.



## Overview of Current Energy Issues

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### Caspian Energy Resources and Transit Options

The Caspian–Central Asia region holds 48 billion barrels of proven oil reserves. We estimate that total recoverable petroleum resources are roughly 2.5 times this amount.<sup>1</sup> As Table 2.1 illustrates, energy resources are spread unevenly throughout the region. Kazakhstan and Azerbaijan have the largest recoverable oil reserves. Turkmenistan holds the world’s fourth largest natural gas reserves; its 8.1 trillion cubic meters (tcm) of proven reserves are the energy equivalent of over 50 billion barrels of crude oil. For the region, we estimate total recoverable natural gas at roughly 40 tcm. Neither Kyrgyzstan, home to the U.S. transit center at Manas, nor Tajikistan has substantial reserves of oil or natural gas.

In 2010, Caspian petroleum production averaged slightly over 3 million bpd, of which about 2.5 million bpd were exported. These exports form an important component of the world oil trade, equivalent to almost 10 percent of the total liquid fuel exports from the member nations of OPEC.<sup>2</sup> Considering proven reserve estimates for Kazakhstan, petroleum production and exports from the Caspian have the potential to increase substantially, i.e., to double over the next 25 years. In particular, Kazakhstan’s overall crude output is expected to increase dramatically in coming years because of the development of the Kashagan field, the biggest oil field outside the Middle East.<sup>3</sup> As shown in Table 2.2, nearly all the petroleum exported from

**Table 2.1**  
**Caspian and Central Asian Proven Energy Reserves**

	Petroleum (billion barrels)	Natural Gas (tcm)
Azerbaijan	7.0	1.3
Kazakhstan	39.8	1.8
Turkmenistan	0.6	8.0
Uzbekistan	0.6	1.6
Total	48.0	12.7

SOURCE: BP, 2011.

<sup>1</sup> Recoverable resources include proven reserves, reserve growth, and undiscovered resources. For both petroleum and natural gas, we assumed reserve growth would be 70 percent of proven reserves. For undiscovered resources, we used the F50 recovery estimates from U.S. Geological Survey, 2000.

<sup>2</sup> Liquid fuels include crude oil, natural gas liquids, and refined petroleum products.

<sup>3</sup> The Kashagan field holds an estimated 9 billion barrels of recoverable oil, which makes it comparable to the Prudhoe Bay field on Alaska’s north slope, but recovery is extremely challenging.

**Table 2.2**  
**2010 Production, Consumption, and Apparent Net Exports of Petroleum and Natural Gas**

	Petroleum (000 bpd)			Natural Gas (bcm/year)		
	Production	Consumption	Exports	Production	Consumption	Exports
Azerbaijan	1,037	73	964	15.1	6.6	8.5
Kazakhstan	1,757	262	1,495	33.6	25.3	8.3
Turkmenistan	216	125	91	42.4	22.6	19.8
Uzbekistan	87	104	—	59.1	45.5	13.6
Total	3,097	564	2,533	150.2	100.0	50.2

SOURCE: BP, 2011.

the Caspian is from Azerbaijan and Kazakhstan. Production from Turkmenistan and Uzbekistan is relatively small and will likely continue to be used to meet domestic petroleum demand within those nations.

In 2010, roughly 50 percent of natural gas exports went to Russia. About 7 bcm were delivered to Iran, nearly all of which originated in Turkmenistan. The 2010 production levels for Turkmenistan are not indicative of its forthcoming production capacity: A break in a pipeline to Russia severely curtailed production in April 2009. Gas exports to Russia resumed in January 2010, but at a reduced price and greatly reduced level. A pipeline that would allow exports to China opened in 2010, but at a small fraction of its eventual design capacity of 40 bcm per year. Azerbaijan is five to six years away from ramping up its natural gas export capacity; it delivered about 4 bcm to Turkey in 2010 (BP plc, 2011). Most of Kazakhstan's natural gas output is a by-product of crude production and is not currently exported, although this could change. Uzbekistan has large potentially marketable volumes of natural gas but also has significant domestic demand and barriers to investment.

Transporting Caspian oil to world markets through routes that bypass Russia or Iran remains a major challenge. (See Table 2.3 for an overview of major Caspian oil pipelines and transit routes.) Most of Azerbaijan's crude output is shipped to the Turkish port of Ceyhan on the Mediterranean via the BTC Pipeline, which opened in 2006. The BTC Pipeline is the first major export route for Caspian oil that does not pass through Russian territory and that bypasses the Bosphorus Strait (see Figure 2.1). Landlocked Kazakhstan remains heavily dependent on the Russian oil export pipeline network; it sends large volumes of crude from onshore fields via the Caspian Pipeline Consortium (CPC) pipeline to a Russian terminal on the Black Sea near Novorossiysk.<sup>4</sup> The oil is then loaded onto tankers that must transit via the Bosphorus. The remainder of Kazakhstan's output is sent to Azerbaijan (for shipment through the BTC Pipeline), China's western Xinjiang province, and the Batumi terminal on Georgia's Black Sea coast.

Oil companies rely heavily on tanker transit through the Bosphorus, a challenging waterway that is only 700 meters wide at its narrowest point. The 1936 Montreux Treaty gives Turkey sole control over transit through the strait and the Dardanelles yet mandates free access to all commercial vessels. Commercial traffic in the Bosphorus has increased steadily in recent

<sup>4</sup> Efforts to double the capacity of the CPC pipeline have been delayed for many years due to objections from Russia, the largest shareholder. The delay has severely affected operations at Kazakhstan's Chevron-led Tengiz oil field, cutting potential output by roughly half (Rodova, 2010, p. 1; Kramer, 2010).

**Table 2.3**  
**Selected Caspian and Turkey Oil Pipeline Projects**

Project	Parameters
Baku-Tbilisi-Ceyhan (BTC)	
Route	Baku, Azerbaijan—Tbilisi, Georgia—Ceyhan, Turkey
Distance (km)	1,800
Capacity (bpd)	1.2 million
Operation start (year)	2006
Baku-Supsa	
Route	Baku, Azerbaijan—Supsa, Georgia
Distance (km)	830
Capacity (bpd)	100,000
Operation start (year)	1999
Caspian Pipeline Consortium (CPC)	
Route	Tengiz, Kazakhstan—Novorossiysk, Russia
Distance (km)	1,510
Capacity (bpd)	650,000
Operation start (year)	2001
Kirkuk-Ceyhan	
Route	Kirkuk, Iraq—Ceyhan, Turkey
Distance (km)	1,000
Capacity (bpd)	1.65 million
Operation start (year)	1977
Kazakhstan-China Pipeline	
Route	Atyrau, Kazakhstan—Alashankou, China
Distance (km)	2,200
Capacity (bpd)	400,000
Operation start (year)	In stages from 2004
Trans-Anatolian Pipeline <sup>a</sup>	
Route	Samsun, Turkey—Ceyhan, Turkey
Distance (km)	555
Capacity (bpd)	1 million
Operation start (year)	Unknown

SOURCES: International Energy Agency (IEA), 2010c; EIA, 2011.

<sup>a</sup> Information about this pipeline is projected and pending a decision to build; includes intended capacity upgrade to 1.5 million bpd.

years: According to the Turkish Minister of Transportation, 50,000–55,000 ships now pass through the strait annually, with oil tankers accounting for approximately two-thirds of all cargo in terms of tonnage (“Security in Straits . . .,” 2010). Oil volumes transiting via the Bosphorus have declined somewhat in recent years as Russian producers have taken advantage of the recently completed the Baltic Pipeline System and the Eastern Siberian–Pacific Ocean pipeline.

Traffic in the Bosphorus is an extremely sensitive topic across the political spectrum in Turkey. While the installation of the Vessel Traffic Service in 2003 has improved safety and navigation procedures, the strait has nonetheless been the site of several major accidents. Turkey



**Figure 2.1**  
**Caspian Crude Oil Export Routes**



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RAND TR1144/2-2.1

is concerned about the environmental dangers that the growth of maritime traffic through the Bosphorus presents and has periodically attempted to impose stricter curbs on transit to reduce the likelihood of accidents and threats to the region's fragile environment. Following the Deepwater Horizon disaster in the Gulf of Mexico, Turkey launched a new multiyear process to change access procedures for commercial vessels and tankers.<sup>5</sup>

The Bosphorus also poses practical complications for the oil industry. Tankers exiting the Black Sea through the strait must comply with a strict navigation regime and encounter frequent traffic and weather delays. These delays can be costly, leading to millions of dollars in additional charges for oil companies. Turkey has tried for more than a decade to promote the construction of a bypass pipeline that would reduce the need for tankers to transit the Bosphorus but has made little progress. For several years, Turkey and Russia backed rival proposals. Turkey was promoting an oil pipeline that would transport oil from the Black Sea port of Samsun across Turkey to the terminal at Ceyhan on Turkey's Mediterranean coast. Russia, among others, backed a far shorter, and thus far more economical, pipeline that would originate at Bourgas on Bulgaria's Black Sea coast and terminate at the Greek port of Alexandroupoli. In 2010, Turkey and Russia announced their agreement to construct the multibillion dollar pipeline from Samsun to Ceyhan ("Turkey, Russia . . ." 2010). Of all the pipelines proposed to bypass the strait, the Trans-Anatolia Pipeline is the most expensive and economically

<sup>5</sup> These measures include higher insurance rates and restrictions on the total number of tankers and the size of loads allowed to pass through the Bosphorus (Strauss, 2010; Ersoy, 2010).

least desirable. Whether this project is actually realized remains uncertain (as of our publication date), being subject to continuing negotiations between Turkey and Russia regarding the financial terms of the agreement (“Russia Presents . . .,” 2011).

Kazakh oil now accounts for the bulk of the oil being shipped through the Bosphorus, with even more expected due to the planned expansion of the CPC pipeline. Thus, some observers see the Russian push for a bypass under its financial control as a possible way for Moscow to extract rents from Kazakh oil producers (Chow, 2011). Another factor promoting Russia’s backing of the Samsun-Ceyhan pipeline may have been Bulgaria’s decision to formally withdraw from the Russian-backed Bourgas-Alexandroupoli pipeline project (Hope and Troev, 2010).

The biggest unexploited prize in the Caspian is likely to be the region’s vast natural gas reserves, which have spawned several competing pipeline proposals. Several factors will shape the future of these proposed pipelines (see Figure 2.2), most important among them the economic viability of proposed transit routes,<sup>6</sup> Russia’s desire to limit competition for its share of the European gas market, the robustness of any recovery in European gas demand, and China’s growing interest in accessing supplies of gas from the Caspian and Central Asia.

Natural gas from Azerbaijan will have a significant influence on the region’s energy future. Presently, Azerbaijani gas from the first phase of development of the offshore Shah Deniz field is sent to Turkey via Georgia through the South Caucasus Pipeline (see Table 2.4). This pipeline, running from Baku to Ceyhan, Turkey, started operations in 2006, and parallels the BTC Pipeline. The BP-led consortium responsible for development of the second phase of Azerbaijan’s Shah Deniz field is expected to make decisions about the most commercially attractive route for this gas in 2011. Several proposals are on the table, most notably the Nabucco Pipeline, a €8 billion (\$12 billion) megaproject that would transport 31 bcm of gas annually to Europe through Turkey, Bulgaria, Romania, Hungary, and Austria. Competing proposals are more modest, generally involving upgrading the existing Turkish gas pipeline system and adding connections to Greece and Italy. The proposed Italy-Greece-Turkey Interconnector would link the gas transportation systems of the three countries and carry some 11 bcm annually. A third competing proposal, the Trans-Adriatic Pipeline, would take 10 bcm of Caspian gas through Greece and Albania to Italy and onward to European markets.

The other big natural gas player in the Caspian is Turkmenistan. The years of eccentric and reclusive behavior of its late president-for-life Sapamurad Niyazov fostered Turkmenistan’s international isolation and economic backwardness. Under Niyazov’s leadership, international energy companies were deterred from investing in major energy development projects, and Turkmenistan, which is widely believed to possess the world’s fourth largest gas reserves, today produces only a small fraction of its potential.

Since Niyazov’s death in December 2006, however, Turkmenistan has signaled a new openness toward foreign investment. Previously, Russia had a near-complete monopoly over Turkmenistan’s exports, which were shipped to Russia, Ukraine, and European consuming countries via the Soviet-era pipeline network controlled by Russia. Under the leadership of

<sup>6</sup> There are significant differences between oil and natural gas pipelines. Oil, a fungible commodity priced in dollars, trades freely on global spot and futures markets and can be transported fairly easily. The economics behind the construction and operation of natural gas pipelines are more complicated because they are usually based on contracts lasting 20 years or longer. That creates an enduring (and potentially costly) set of shared responsibilities for suppliers and consumers. Gas prices in these contracts are typically indexed to oil prices over a six- to ten-month period to ensure that they stay competitive with the prices consumers pay for other nongas fuels.

**Figure 2.2**  
**Caspian Natural Gas Export Routes**



SOURCE: Jones, 2010. Copyright OECD/International Energy Agency. Used with permission.

RAND TR1144/2-2.2

Niyazov's successor, Gurbanguly Berdimuhamedov, the December 2009 opening of a new pipeline to China's Xinjiang province and a more modest pipeline to Iran significantly expanded the country's export options.

There is now considerable discussion of possible options for transporting gas from Azerbaijan or Turkmenistan to European markets. Of the proposed pipelines, the Nabucco project, because of its larger carrying capacity and connection to Eastern Europe, has garnered the lion's share of attention from politicians, policy experts, and the media, but not from industry. If built, the Nabucco Pipeline would greatly enhance Turkey's role as an important regional actor and make the country a key part of Europe's efforts to diversify its energy supplies. However, Nabucco faces a number of obstacles that raise serious questions about its viability (Barysch, 2010b). The most serious problem is finding sufficient gas to fill the pipeline. Azerbaijan has been reluctant to make a formal commitment to supplying gas for the pipeline because of doubts about the project's commercial viability, a desire not to put all its eggs in one broken basket, and its intention to identify the most profitable and reliable route for Azerbaijani gas exports. To be commercially viable, Nabucco needs to find suppliers. Nabucco's other major shortcoming is the conspicuous lack of involvement by major international oil and gas companies. The consortium's members are a collection of gas distribution companies from

**Table 2.4**  
**Selected Caspian and Turkey Natural Gas Projects**

Project	Parameters
South Caucasus Pipeline (SCP)	
Route	Azerbaijan—Georgia—Erzerum, Turkey
Distance (km)	692
Annual capacity (bcm)	8 (possible expansion to 20)
Operation start (year)	2006
Nabucco (proposed)	
Route	Turkey—Bulgaria—Romania—Hungary—Austria
Distance (km)	4,040, including feeder lines
Annual capacity (bcm)	initial, 8, expansion to 31 bcm
Estimated cost (\$B)	10—12
Operation start (year)	2016 (projected)
Turkey-Greece-Italy Interconnector	
Route	Turkey—Greece—Otranto, Italy via the Ionian Sea
Distance (km)	807
Annual capacity (bcm)	11 (8 of which go to Italy)
Operation start (year)	2007 to Greece, 2012 to Italy
Trans-Adriatic Pipeline (proposed)	
Route	Thessaloniki, Greece—Albania—Southern Italy
Distance (km)	520, including 115 km undersea section
Annual capacity (bcm)	up to 20
Operation start (year)	2016 (projected completion)
Central Asia–China Gas Pipeline	
Route	Turkmenistan—Uzbekistan—Kazakhstan—China
Distance (km)	2,000 (to China's border, eventually 7,000)
Annual capacity (bcm)	10; expansion up to 40 bcm
Operation start (year)	2010
Iran-Turkey Gas Pipeline	
Route	Iran—Turkey
Distance (km)	1,199
Operation start (year)	2001
Arab Gas Pipeline	
Route	Egypt—Jordan—Syria—Lebanon
Distance (km)	1,200
Annual capacity (bcm)	10
Operation start (year)	2003
South Stream (proposed)	
Route	Russia—Bulgaria (offshore) Bulgaria—Central Europe—Italy (onshore)
Distance (km)	900 (offshore section)
Annual capacity (bcm)	63
Estimated cost (\$B)	32.5
Operation start (year)	2015 (projected)

SOURCE: IEA, 2008; IEA, 2010c.



Central Europe, Turkey, and Germany, none of which commands the technology, financial strength, investment resources, or access to supply of a major Western oil company.<sup>7</sup>

Russia has systematically sought to undermine Nabucco, viewing it as unwelcome competition for European gas markets. In particular, Gazprom has promoted a competing concept, the South Stream Pipeline. This pipeline would carry up to 63 bcm per year and would run under the Black Sea to reach the same markets in Eastern Europe and the Balkans that Nabucco would serve. South Stream's long undersea route and high price tag of \$25 billion to 30 billion—more than twice the projected cost of Nabucco—have fostered the widely shared assessment that it is not commercially viable and that its primary purpose is to choke off potential sources of investment for a non-Russian-controlled southern gas corridor (Socor, 2010c).

## Turkey's Energy Outlook

Energy is a major domestic and foreign policy issue in Turkey, reflecting the needs of its rapidly growing economy. Turkish GDP has nearly doubled since 1990, and the country has emerged quickly from the economic downturn that began in 2008. Such growth has come at the cost of extremely high energy import dependence, however. Overall energy consumption and natural gas consumption, in particular, have soared. With continuing economic growth, Turkish energy consumption will likely double over the next ten years (IEA, 2009b, p. 7). Turkey relies heavily on imports of natural gas from Russia and Azerbaijan. Two pipelines carry the gas from Russia, one crossing Romania and Bulgaria and the other, the Blue Stream Pipeline, running beneath the Black Sea. Azerbaijani gas is delivered by the South Caucasus Pipeline, which carries nearly 8 bcm of Azerbaijani gas from the Shah Deniz 1 field to Erzerum in eastern Turkey (see Figures 2.2 and 3.1).

The Turkish government's main energy priority is ensuring the security of affordable supplies. This goal lies at the heart of Turkey's energy diplomacy and its desire to become a key transit route and energy hub for the transport of oil and gas from neighboring regions to European markets.<sup>8</sup> Turkey's economic vitality, long-standing transatlantic economic and political ties, and existing energy infrastructure make it an attractive partner to European energy importing nations. Its location positions Turkey to have easy access to supplies from the Caspian, Middle East, Russia, and North Africa. Turkish officials routinely point to the presence of 70 percent of the world's proven oil and natural gas reserves in its immediate neighborhood (Cimen, 2009).

Turkey already plays an important role in the transit of oil and gas supplies from these regions. Pipelines from Russia and Azerbaijan bring significant quantities of oil and natural gas into Turkey, and large quantities of Russian and Kazakh oil are shipped via the Bosphorus. Turkey also provides an important outlet for Iraqi crude via the Kirkuk-Ceyhan oil pipeline, which was originally built in the late 1970s.

<sup>7</sup> The consortium consists of OMV (Austria), MOL (Hungary), Transgaz (Romania), Bulgargaz Holding (Bulgaria), BOTAS (Turkey), and RWE (Germany). Each participant has a 16.67-percent share in the project.

<sup>8</sup> Implementation of Turkey's energy security goals also involves domestic measures directed at lowering the demand for imported energy by improving energy efficiency and increasing the use of nuclear, lignite, and hydropower for power generation (IEA, 2009b).

However, Turkey's own actions and policies have also contributed to delays in creation of a southern energy corridor that would circumvent Russia and Iran. In negotiations on Nabucco, Ankara initially demanded the right to buy, at below-market prices, 15 percent of the gas that would transit Turkey en route to Europe. This "lift-off" portion was ostensibly aimed at satisfying domestic demand, but potential suppliers and EU officials were skeptical, suspecting that Turkey simply planned to resell this gas at a higher price and pocket the difference. (Winrow, 2009) This perception has helped foster a sour mood in EU-Turkish discussions on energy and in Turkish negotiations with Caspian energy producers.

One of the biggest short-term impediments to the creation of a southern gas corridor was the long-running disagreement between Turkey and Azerbaijan over pricing and terms for the transport of Azerbaijani gas across Turkish territory to European markets. The dispute, which turned on the original terms for the delivery and pricing of gas from the Shah Deniz I field to Turkey, was reportedly settled in June 2010. Although details of the agreement have not been publicly disclosed, Azerbaijan has reportedly agreed to make up to 12 bcm of gas available for export to Turkey.<sup>9</sup>

Another obstacle is that the energy industry sees Turkey as an unreliable gas buyer and undependable transit country. Turkey regularly overestimates its need for gas and its ability to pay. Specifically, Turkey has reneged on its pledges to buy gas, including arrangements for gas from Russia's Blue Stream Pipeline, from Iran, and from the first phase of the Shah Deniz project. Also, it failed to deliver gas to Greece shortly after the inauguration of the Turkey-Greece Interconnector (ITG) Pipeline. Thus, Turkey can be not only a gateway but also at times a barrier to gas transit (Chow, 2009).

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<sup>9</sup> Although the price Turkey will pay for Azerbaijani gas was not revealed, Turkish officials have said the price will be adjusted according to market conditions and will be less than what Turkey currently pays for Russian gas ("Turkey, Azerbaijan . . .," 2010; "Turkey Business . . .," 2010).



## Key Energy Security Challenges

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### The Role of the Caspian for European Energy Security

Europe faces a major energy security challenge due to its growing appetite for imported natural gas, particularly from Russia. Attention has focused in recent years on the Caspian region as a possible alternative to Europe's current supply arrangements. For EU and U.S. advocates of a southern gas corridor, a new transit route for Caspian gas through Turkey would have important energy security and geostrategic implications. This effort would allow Europe to diversify the sources of its gas supplies while creating long-term economic and political bonds with Turkey and Caspian energy producers.

The trends driving Europe's increased dependence on natural gas imports are likely to be long lasting. Indigenous gas production is reaching a plateau, and widespread concerns about climate change are leading to the retirement of coal-fired power plants and an increase in the share of power coming from renewables. With nuclear power controversial in many countries, the EU's reliance on natural gas, especially for power generation, is expected to grow substantially in coming years.

Few topics in European policy circles are as divisive as energy security and Russia's role in supplying the continent's gas market. In recent years, a series of disputes between Russia and transit states, such as Ukraine, left citizens of Eastern European and Balkan countries without heat in their homes in the dead of winter. These events raised serious questions about Europe's dependence on Russian gas and the potential use of energy as a political weapon.

However, the ensuing debate on energy security has revealed significant divisions among member countries. Part of the problem is that Europe's gas market is highly segmented and that the level of dependency on Russian gas, especially for residential heating, varies dramatically in different regions. For the old EU member states (the EU15) as a group, Russian gas satisfies just 20 percent of gas demand:

But the size of the western European markets means that slightly more than two thirds of Russian gas consumed in Europe is imported by the EU15, despite their lesser dependence on Russia. (Noel, 2008, p. 9)

In Germany, France, and Italy, vertically integrated energy companies, such as E.ON AG, GDF Suez, and Enel, dominate national markets. Several of these companies were among the original European proponents of importing natural gas from Russia in the 1970s at the height of the Cold War. Over many decades, they have built close relationships with Russian counterparts at Gazprom (the Russian state-controlled company that has sold minority stakes to private investors), fostering a level of interdependence that has been reliable and lucrative for European and Russian commercial entities, but not for European gas consumers.



The situation is quite different in Eastern Europe and the Balkans, where, despite historical worries about Russian domination, the level of dependence on Russian gas is far higher, reaching 80 percent in such countries as Latvia, Bulgaria, and the Czech Republic. This dependence has been aggravated by the absence of competitive and open European energy markets (and the associated cross-boundary European gas distribution infrastructure), where these countries might be able to purchase gas and electricity in the event of a shortfall. However, the relatively small size of Eastern European energy markets limits their clout in debates in Brussels and diminishes the commercial viability of pipeline projects, such as Nabucco.

The EU's public rhetoric has given Nabucco high priority, and in March 2010, the EU agreed to allocate €200 million to help finance construction of the pipeline. The announcement was hailed as an important breakthrough by Gunther Oettinger, the European Commission's Commissioner for Energy (Kanter, 2010). However, the EU decision on Nabucco will cover only 2.5 percent of the projected cost of the project, which is currently estimated at €8 billion. Considering the extremely challenging conditions the eurozone's financial system faces and the mood of austerity sweeping EU governments, it is questionable whether additional EU public-sector funding will become available any time soon.

It is also unclear that building new pipelines from the Caspian would be a panacea for Europe's gas needs, in light of recent changes in gas markets that are fostering greater supply diversity: the increased role of liquefied natural gas (LNG) and pipeline imports from North Africa. The Nabucco Pipeline, with a planned annual capacity of 31 bcm by 2020, would satisfy less than 7 percent of current (2009) EU gas demand and an even smaller fraction of projected gas demand in 2020. In the meantime, the EU is also pursuing targeted projects that will help limit Eastern Europe's and the Balkans' dependence on Russian gas in the near term. These efforts, which include expanding cross-boundary pipeline links and increasing overall gas storage capacity, will increase the flexibility of the inter-European gas system and enhance energy flows among countries in the event of another crisis.<sup>1</sup>

## Turkey's Emergence as a Regional Power

The changing nature of Turkey's role in its neighborhood is likely to have a major effect on Europe's energy security strategy and on future oil and gas projects in the Caspian and Middle East. The disappearance of the Soviet threat removed the main rationale behind the U.S.-Turkish security partnership and reduced Ankara's dependence on Washington for its security. At the same time, it has opened up new opportunities in areas that had previously been neglected or were off-limits to Turkish foreign policy, particularly the Middle East, the Caucasus, and Central Asia. Turkey still wants strong security and defense ties to the West, especially the United States. But the terms of engagement have changed. Economically vibrant and politically self-confident, Ankara today is no longer content to play the role of a junior partner and has demonstrated repeatedly that U.S. concerns weigh less in decisions on issues that bear directly on Turkey's regional interests (Larrabee, 2010).

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<sup>1</sup> This multipronged initiative includes construction of an LNG terminal in Poland on the Baltic coast, development of a series of north-south interconnections stretching from the Aegean and Adriatic seas to the Black and Baltic seas, and creation of a so-called Energy Community Gas Ring in seven southeast European countries that will unify their gas markets.

In addition, with the end of the Cold War, the locus of threats and challenges to Turkish security has shifted to its southern border—e.g., rising Kurdish nationalism and separatism; sectarian violence in Iraq; the possible emergence of a nuclear-armed Iran; and a weak, fragmented Lebanon dominated by radical groups with close ties to Iran and Syria. As a result, Turkish strategic attention is today increasingly focused on the Middle East. At the same time, the incentive for Turkey to promote stability on its southern border and cordial ties with its regional neighbors, particularly Iran and Syria—two countries with which the United States has serious differences—has increased.

Turkey's efforts to broaden its ties to the Middle East and Caucasus have coincided with and been influenced by growing problems in its relations with Europe. Although Turkey opened accession negotiations with the EU in October 2005, its membership bid has since confronted increasing obstacles and lost important momentum. Popular opposition to Turkish membership has increased visibly in Europe. With a population of nearly 70 million, Turkey would be the second largest EU member behind Germany—and one of the least developed. In addition, the Islamic roots of Turkey's ruling Justice and Development Party have cast religious issues in starker relief. Many in the EU appear to be uncomfortable with the prospect of a large, predominantly Muslim country within the EU. As former Dutch Foreign Minister Hans van Mierlo noted some years ago, "There is a problem of a large Muslim state. Do we want that in Europe? It is an unspoken question" (Kinzer, 1997).

The increasing popular opposition in Europe to Turkish membership in the EU has contributed to a growing disenchantment in Turkey with the EU.<sup>2</sup> The danger is not that Turkey or the EU will break off negotiations but that the relationship will collapse by default—what Katinka Barysch has termed the "risk of slow death"—as Turkey and the EU run out of things to negotiate.<sup>3</sup> The loss of momentum in Turkey's EU membership bid is reinforcing Ankara's desire to expand its ties to other areas, especially the Middle East and Caucasus, and to adopt a more activist foreign policy in areas and countries where it has long-standing historical and cultural ties.

Relations with Russia have expanded dramatically over the past decade in what Fiona Hill and Omer Taspinar have dubbed an "axis of the excluded" (Hill and Taspinar, 2006). Russia is Turkey's main supplier of natural gas and its second largest supplier of crude. In December 2004, Putin became the first Russian head of state to visit Turkey in 32 years, and the two countries issued a broad-ranging joint declaration on the "Deepening of Friendship and Multi-Dimensional Partnership."<sup>4</sup> Closer ties between Ankara and Moscow have in turn made Turkey more sensitive to Russian concerns in the Caucasus and Central Asia. This was

<sup>2</sup> Public support in Turkey for the country's EU membership, although still solid, has declined visibly over the last several years. In 2004, 73 percent of the Turkish population supported Turkish membership, but that figure dropped to 54 percent in 2006 and to 48 percent in 2009. This sharp decline illustrates how strongly the Turkish public's mood toward the EU has soured lately. This is true even among traditionally Western-oriented Turks ("Transatlantic Trends, Key Findings," 2009, p. 25).

<sup>3</sup> The two sides have been negotiating for over two years. During that time, they have opened 12 chapters of the *acquis communautaire*, but closed only one (science). Of the remaining chapters, the EU has suspended eight because of Turkey's failure to open its ports and airports to Cypriot vessels, as required under the Ankara protocol. France has vetoed talks on five others, which it claims prejudice full membership (Barysch, 2010b, p. 3).

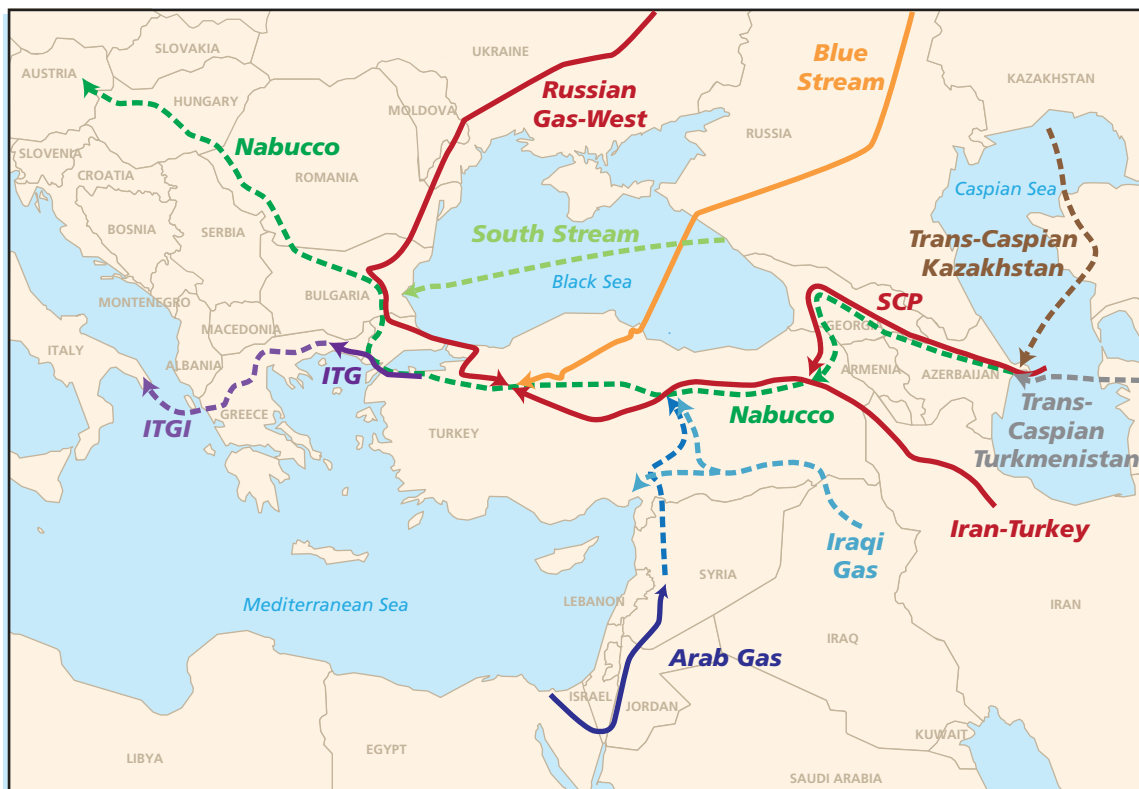
<sup>4</sup> The 2004 declaration was updated and expanded during President Gul's visit to Moscow in February 2009 (Turkish Ministry of Foreign Affairs, 2009).

well illustrated by Turkey's reluctance to criticize the Russian invasion of Georgia in August 2008.

Meanwhile, Turkey's newfound focus on the greater Middle East is spurring a search for new transit routes for major energy producers in the region. Turkey's geographical proximity to the region's enormous gas reserves and a rapidly expanding commercial and economic presence could prove beneficial in coming years, laying the groundwork for possible future new gas export routes across Turkey to European markets (See Figure 3.1). But the political, economic, and technological obstacles to accomplishing such projects should not be underestimated, and they face stiff competition from alternative sources of supply, such as LNG and possibly shale gas. Iran's controversial nuclear activities have led to extensive U.S. and EU sanctions against foreign investments in its oil and gas sector. Security problems and tensions between the central government in Baghdad and the Kurdish Regional Government are likely to hinder Iraqi ambitions to revitalize its energy sector in the north. There are also significant technical challenges. Any medium- or large-scale energy transit projects involving the Middle East would likely require significant upgrades of Turkey's domestic gas pipeline network. According to Gareth Winrow,

[T]he grid in its current state only has a spare capacity of around 6 bcm per year. . . . There may be scope for incremental additions to the grid to accommodate the amounts envisaged

**Figure 3.1**  
**Major Gas Pipeline Projects in and Near Turkey**



NOTE: Solid lines are existing pipelines, dashed lines are proposed pipelines.

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for the Turkey-Greece-Italy Interconnector but, according to some analysts, any project involving the transportation of over 8 bcm per year would require a stand-alone pipeline to be constructed across Turkey. (Winrow, 2009, p. 34)

### **Energy Cooperation with Iraq**

Iraq, a major Turkish partner in the oil sphere since the late 1970s, would appear to be a natural source for future natural gas projects. However, any expansion of the country's export capacity faces significant hurdles. Iraq currently does not produce natural gas in marketable quantities, despite the presence of significant reserves. Although the government desperately wants to increase natural gas supplies for the country's hobbled power sector, this task is complicated by a lack of adequate infrastructure for natural gas processing and storage. Iraq, therefore, is trying to attract foreign investment for development of new natural gas fields for its own use and to capture gas associated with oil production that would otherwise be flared or reinjected into wells.

Several of the country's largest undeveloped natural gas fields are located in Kurdish-dominated northern Iraq, which enjoys better security conditions and more-effective local governance than the rest of the country. This has spurred Kurdish and foreign hopes for a rapid expansion of Iraqi gas exports to Europe via Turkey. Yet, major political, legal, and constitutional questions stand in the way of progress. The Kurdistan Regional Government claims authority to negotiate contracts on energy exploration and development projects. This has caused tensions with the central government in Baghdad, which wants to link future gas exports with meeting urgent domestic electricity-generation needs.<sup>5</sup> Making matters worse, there are significant problems with pipeline security on both sides of the Turkey-Iraq border, a topic addressed in Chapter Four.

### **Energy Cooperation with Iran**

The hurdles to expansion of energy cooperation with Iran are even greater, and Turkish attempts to import natural gas from Iran since 2001 have been marred by disappointment on both sides (Kinnander, 2010). Iran's energy sector, which boasts the largest gas reserves in the Middle East, has been badly hurt by U.S.- and EU-led sanctions, and the country is actually a net importer of natural gas.<sup>6</sup> Major Western energy companies, such as Total, Shell, and Repsol, have backed out of high-profile projects in Iran's gas sector. Turkish officials who once trumpeted Iran's potential involvement in the Nabucco project and spoke lavishly of plans to invest billions of dollars in Iran's massive South Pars gas fields have now quietly backed away from both ideas in the face of staunch U.S. and European opposition.<sup>7</sup> Lacking big foreign

<sup>5</sup> Iraq's main political actors hold differing interpretations of the constitution with regard to the roles and powers of federal, regional, and governorate authorities in the development and management of Iraq's energy sector, and these have led to a political impasse over oil and gas issues. Enactment of vital hydrocarbon sector and revenue-sharing legislation remains stalled as of this writing. For a detailed analysis of the legal uncertainty and challenges facing Iraq's energy sector, see Blanchard, 2010.

<sup>6</sup> Iran relies increasingly on gas from Turkmenistan to meet heating and electricity demand in population centers in northern Iran.

<sup>7</sup> Turkish Energy and Natural Resources Minister Taner Yıldız has claimed publicly that the deal over South Pars fell apart because "[f]rom the technical standpoint, we could not agree on the modeling system or how to share duties and responsibilities," not because of U.S.-EU sanctions (Kilic, 2010).

investors, the Iranian government has in turn abandoned the development of South Pars for LNG exports (Faucon and Swartz, 2010).

Iran's energy sector faces major structural challenges that will evade quick fixes and choke off any expansion of its relationship with Turkey. Iran's domestic gas demand is soaring. Reinjection requirements for maturing oilfields are increasing. Pipeline infrastructure for carrying gas from South Pars to the Turkey-Iran border is nonexistent. Access to advanced technology and outside investment has been curtailed by U.S.- and EU-backed sanctions. Against this backdrop, it is not surprising that Iran is struggling to fulfill the terms of its modest existing gas contract with Turkey, which calls for 9 bcm per year of gas to be exported via the Iran-Turkey gas pipeline. Shipments have been interrupted repeatedly, and average annual deliveries have been only about half the agreed level. Iran's erratic performance has damaged its image as a reliable supplier and triggered an acrimonious legal dispute.<sup>8</sup>

### **Energy Cooperation with Other Middle Eastern Countries**

Turkey has also eyed both Egypt and Qatar for future gas pipelines and energy development projects. Cooperation with Egypt may hold the greatest promise in the near term. Turkey is completing a pipeline link to the recently expanded 10 bcm Arab Gas Pipeline, which supplies customers in Jordan, Lebanon, and Syria. Over time, this route could be expanded to enable Egypt to export gas to Europe via Turkey. Iran and Iraq have also expressed interest in using this route for future exports to Europe, although no concrete pipeline proposals are currently on the table (Rasheed, 2009; Lando and Egbali, 2010).

Turkey's relationship with Qatar, home to the world's third largest reserves and the leading global LNG exporter, is effectively on hold for two main reasons. First, Qatar is observing a self-imposed moratorium on new export projects that was implemented prior to the emergence of a global LNG supply glut. Second, any new pipeline to Turkey would need to cross Saudi territory, and Saudi support for such an effort is far from certain. Saudi-Qatari mistrust has undermined development of far-more-modest regional energy pipeline projects in the past, and it is not clear that the kingdom would be willing to endorse a project that also benefits Syria, which likely would be included in any pipeline route (Dourian, 2009).

### **Russia's Role in Caspian Energy**

Russia is skillfully using a mix of political and economic tools to dominate energy development in the Caspian and to undermine confidence in non-Russian-controlled transit routes that might threaten Russia's share of the lucrative European gas market. Moscow has taken a multilayered approach, dangling commercial incentives for bilateral cooperation with Azerbaijan and Turkmenistan, while also demonstrating to Kazakhstan and Turkmenistan that it is prepared to take maximum advantage of its control over major export routes. With its European customers, Moscow has worked hard to reestablish Russia's reliability as an energy sup-

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<sup>8</sup> The dispute, rooted in Turkey's failure to import quantities of gas specified in take-or-pay provisions and Iran's attempt to postpone deliveries because natural gas was needed to meet urgent domestic demand requirements, was referred to international arbitration. During this dispute, Turkey also cited quality problems with the Iranian deliveries. The case was decided in Turkey's favor in autumn 2009 (Kinnander, 2010, pp. 8–11 and 14–18).



plier by backing new pipeline routes that would avoid troublesome transit states like Ukraine and Belarus.<sup>9</sup>

However, over the past two years, Gazprom and the Russian economy have been badly shaken by dramatic disruptions in European natural gas markets and sharply lower demand for Russian gas.<sup>10</sup> What happened? Due to soaring U.S. shale gas production, the U.S. market for LNG essentially dried up. As a result, LNG cargoes originally destined for the United States were diverted to European ports and sold at a substantial discount to Gazprom's long-term contracts. The resulting supply glut gave European consumers (for the most part, electric utilities) a powerful incentive and the power to renegotiate or walk away from contractual obligations with Russia and other energy producers. Large European energy consumers also took advantage of a nascent yet burgeoning spot market (IEA, 2010c, p. 185).

Russia has been very adept at managing relationships with potential gas supply competitors in its neighborhood. In the case of Azerbaijan, Moscow has capitalized on President Ilham Aliyev's irritation with Turkey and the United States and is trying to convince him to allow Gazprom to purchase all of Azerbaijan's natural gas output based on current European prices. So far, however, Azerbaijan has not embraced the offer because it would increase its economic and political dependence on Russia (Clark and Bierman, 2009).

The Azerbaijanis' recent tilt toward Moscow has been driven by concerns about the ongoing Turkish-Armenian reconciliation process. Azerbaijan believes that an opening of the Turkish-Armenian border would reduce Armenia's incentive to make concessions that could facilitate a settlement of the long-running conflict over Nagorno-Karabakh. Azerbaijan thus pressed the United States and Turkey to maintain the linkage between reopening the Turkish-Armenian border and redeployment of Armenian troops from occupied Azerbaijani territories adjacent to Nagorno-Karabakh.<sup>11</sup>

Azerbaijan's sense of grievance toward the United States, which it believes is heavily biased toward Armenia, was clearly visible in early 2010.<sup>12</sup> There is a pervasive sense in the senior ranks of the Azerbaijani leadership that American policymakers have taken for granted Azerbaijan's support for U.S. foreign policy priorities after September 11, 2001, including its

<sup>9</sup> The recent Russian-Ukrainian rapprochement, which Ukrainian President Viktor Yanukovich forged, has not fundamentally changed Russia's views about the risks of relying on transit states for gas exports. Gazprom's Nord Stream Pipeline is already under construction and will carry up to 55 bcm of Russian gas from the Russian-Finnish border to western Europe underneath the Baltic Sea at a cost of approximately \$10 billion. The troubled South Stream Pipeline, under the Black Sea, which was discussed in Chapter Two and has not yet reached the construction stage, is expected to cost upwards of \$30 billion.

<sup>10</sup> Russia's exports to Europe in 2010 are expected to be more than 21 percent below 2008 levels. The percentage of European natural gas demand met by non-Russian suppliers also climbed, thanks to an expansion of LNG terminals and increased LNG shipments from Algeria, Qatar, Egypt, and other countries (Gazprom, 2010a; Gazprom, 2010b, p. 53; BP plc, 2011).

<sup>11</sup> Turkish and American officials tried to mollify Baku by stressing that the strategy on reconciliation and the reopening of the Turkish-Armenian border was aimed in large part at swaying the annual U.S. congressional debate on the Armenian genocide resolution. To Baku, the move was seen as tantamount to betrayal by its Turkish partners (Socor, 2010a).

<sup>12</sup> Azerbaijani sensitivities have their origin in U.S. legislation, namely, Section 907 of The Freedom Support Act (U.S. Public Law 102-511). This 1992 legislation prevents any U.S. government assistance to the Government of Azerbaijan absent a presidential determination that Azerbaijan "is taking demonstrable steps to cease all blockades and other offensive uses of force against Armenia and Nagorno-Karabakh." Congress revised the law shortly after September 11, 2001, to create a presidential waiver authority, opening the door to counterterrorism cooperation and limited military-to-military activity (U.S. Public Law 107-115).

troops' participation in Iraq and Afghanistan and its support for the Northern Distribution Network that supplies coalition forces in Afghanistan.<sup>13</sup>

In contrast to its overtures toward Azerbaijan, Russia has used hard-ball tactics toward Turkmenistan to marginalize its role in global energy markets. Until 2009, Gazprom treated Turkmenistan like an important partner and relied on it for large quantities of gas to compensate for declining production at Gazprom's fields in western Siberia. Over time, as an inducement for securing access to Turkmen exports, Russia raised netback prices (i.e., the price for final consumers minus pipeline costs, other tariffs, and taxes) to a level commensurate with prices for European markets.

This arrangement provided Gazprom with reliable, albeit costly, volumes of gas while limiting the incentive for Turkmenistan to seek alternative routes for selling its gas to other potential customers. Eventually, the global financial crisis made the arrangement financially punitive for Gazprom. In April 2009 an explosion along the Central Asia–Center gas pipeline system completely halted deliveries of Turkmen gas to Russia, a development Turkmen President Berdimuhamedov claimed Gazprom had deliberately caused.<sup>14</sup> The eight-month delivery stoppage removed a major drag on Gazprom's cash flow and allowed Russia to negotiate more favorable terms of cooperation.<sup>15</sup> While Moscow's tactics may have infuriated Ashgabat, they did amply demonstrate Russia's willingness to use its control over pipeline transit to cripple potential competitors and to protect Gazprom's long-term financial well-being.

## China's Growing Influence in the Caspian

China has emerged over the past decade as a central player in the Caspian, thanks primarily to its increasing involvement in the oil and gas sectors of Kazakhstan and Turkmenistan. Chinese-sponsored construction of energy infrastructure throughout Central Asia, ranging from pipelines and gas processing facilities to railway lines and refineries, has transformed the region's geopolitical orientation and locked in long-term access to Central Asian gas for China's fast-growing economy. In sharp contrast with Western governments and oil companies, China has repeatedly shown that it is willing to pay top dollar to secure access to raw materials and energy supplies, marshaling massive government resources for the construction of new pipe-

<sup>13</sup> Several other factors reinforced Baku's irritation, including the White House's failure to invite Aliyev to the U.S.-hosted Nuclear Security Summit in April 2010, U.S. press coverage of the multimillion dollar real estate holdings of the Azerbaijani president's family in Dubai, and the prolonged lack of U.S. ambassadorial-level representation in Baku. However, beginning in 2010 the Obama administration has made a concerted effort to strengthen ties to Baku, and relations have visibly improved (Izmailzade, 2010; Whitlock, 2010; Socor, 2010b).

<sup>14</sup> Berdimuhamedov alleged that Gazprom intentionally caused the explosion to block delivery of contracted volumes after demand in Europe and Russia slackened. Gazprom denied responsibility for causing the blast, even though it had failed to notify Turkmen authorities of a drop in pressure along the line (Pannier, 2009).

<sup>15</sup> It was not until late December 2010 that presidents Medvedev and Berdimuhamedov reached agreement on a resumption of shipments from Turkmenistan, albeit at a dramatically lower level. The new agreement requires Russia to purchase only a minimum of 11 bcm in 2010, with an option to buy up to 30 bcm ("Turkmenskiy Gaz . . .," 2009). Turkmenistan exported 48.1 bcm to Russia in 2007 (the last year before the crisis), according to IEA data. Turkmenistan gas output in 2009 dropped 49 percent compared to the previous year (BP, 2011).

lines and infrastructure. Recent rapid growth in Chinese natural gas consumption (albeit from a low base) suggests that its focus on supplies from the Caspian will intensify in coming years.<sup>16</sup>

These tactics have paid off handsomely in terms of access to gas from Turkmenistan, as illustrated by the recent completion of the Central Asia–China Gas Pipeline, which carries gas from Turkmenistan to China’s Xinjiang province, crossing Turkmen, Uzbek, Kazakh, and Chinese territory (Labeled “Turkmenistan to China” in Figure 2.2). This pipeline represents an important strategic milestone for Caspian energy. It opened up the Chinese export market for Turkmenistan, seriously eroding Russia’s market power over Turkmenistan’s exports of gas. It also helped lock in supplies for China, a rapidly growing natural gas consumer, for decades to come. The speed of pipeline construction speaks volumes about China’s ability to accomplish more in a compressed time span than U.S. and European energy companies. The Central Asia–China Gas Pipeline began operations in January 2010, just three-and-a-half years after the project was formally launched by the late Turkmen head of state Niyazov and Chinese President Hu Jintao (Chow and Hendrix, 2010, pp. 37–38).

China also enjoys a unique advantage as the first and only country with a production-sharing agreement for onshore natural gas exploration in Turkmenistan (Nanay, 2009). This agreement is focused on the Amu Darya Basin along the border with Uzbekistan. China is also an important subcontractor for production and exploration at the massive South Yolotan gas field, which is widely believed to be one of the world’s five largest fields. Chinese banks and government entities are providing nearly \$17 billion in financing for gas field development, construction, and related service contracts (*Interfax* . . . , 2009). The two countries are also discussing construction of a new leg to the Central Asia–China Gas Pipeline that would connect it to the South Yolotan–Osman field. If completed, this line would steer gas from Turkmenistan’s single largest field toward Asia and away from European markets.

Sino-Kazakh relations provide another revealing example of China’s strategy for strengthening its position in the Caspian. Hit by a severe banking and economic crisis in 2008, Kazakhstan turned to China for help. In response, China agreed to provide \$10 billion in loans to the Kazakh government and major companies in exchange for the right to purchase major assets in the Kazakh energy sector and to participate in new exploration projects.<sup>17</sup> Oil deliveries to China this year will account for more than 31 percent of the country’s overall output (“Mynbaev Rasskazal . . . ,” 2010). Pipeline links, while still modest, are also being expanded: The main China-Kazakhstan Pipeline will soon be linked to the large oil fields in the Tengiz and Kashagan regions for a maximum capacity of 400,000 bpd,<sup>18</sup> and a new 10 bcm gas pipeline will be connected to the new Central Asia–China Gas Pipeline (which we will discuss later), bringing that line’s full capacity to 40 bcm in 2014 (EIA, 2010b). Overall, these new pipelines will be beneficial for global supplies and help promote the Caspian region’s increased orienta-

<sup>16</sup> Chinese natural gas usage reflects rapid urbanization, increased demand from industrial users and power generation, and environmental concerns about overreliance on coal. China’s government is promoting an increase in domestic gas production (especially from unconventional sources, such as shale), expansion of internal pipeline networks to reach population and industrial centers along the coast, and construction of a network of LNG regasification terminals (Higashi, 2009).

<sup>17</sup> The Chinese loans paved the way for state-owned China National Petroleum Company and KazMunaiGas to jointly purchase a major Kazakh oil firm, MangistauMunaiGaz, which had previously attracted interest from Russian and Indian firms (*Interfax* . . . , 2009; Carew, 2009, p. A10).

<sup>18</sup> The Kazakhstan-China Oil Pipeline’s capacity will reach 400,000 bpd when upgrades are completed (EIA, 2010b).



tion toward China and away from Russia. Over the long term, however, these developments will result in less natural gas moving from Central Asia to Europe.

## Threats to Energy Production and Transit Routes

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Threats to energy facilities, transportation infrastructure, and energy flows in the Caspian and Turkey take several forms. Terrorism is a major threat in Turkey where the June 2010 collapse of a 14-month unilateral PKK cease-fire was punctuated by back-to-back attacks on oil and gas pipelines from Iraq and Iran. The problem is particularly acute in the southeast, where a large portion of Turkey's Kurds reside. Here, the Kirkuk-Ceyhan pipeline has been hit repeatedly, as shown in Table 4.1. Turkey and Iraq have struggled for many years to increase the amount of oil flowing through the Kirkuk-Ceyhan oil pipeline and to create new security arrangements to protect it. Neither effort has succeeded. The pipeline's original design called for a capacity of 1.5 million bpd, but today it carries only a fraction of that amount. Flows through the line remain hampered by unrepaired damage to pumping stations and several acts of sabotage.<sup>1</sup> The unstable security situation has also thrown a chill over discussions about possible construction of a gas pipeline parallel to the oil pipeline that could carry natural gas from Kurdish-controlled parts of Iraq or other parts of the Middle East.<sup>2</sup>

The PKK may have also demonstrated its ability to strike energy targets outside the country's restive Kurdish region. In August 2008, a fire and explosion at a block-valve station in Refahiye, Turkey, knocked out the BTC Pipeline for several weeks. While the PKK claimed responsibility for the explosion (a claim that Western governments and experts widely viewed as credible), Turkish authorities claimed that the explosion was due to a technical failure and have refused to label the explosion an act of terrorism. The Turkish position may be driven by the government's desire to manage foreign investor perceptions; security for the pipeline is the responsibility of the Turkish government, according to the terms of the BTC Pipeline agreement.

If truly an act of terror, the BTC Pipeline attack raises disturbing questions about pipeline security procedures inside Turkey. In particular, there is considerable concern in both industry circles and Western governments about the level of security at dozens of aboveground block valve stations in Turkey, some of which may be particularly vulnerable because they reportedly were not built to the proper specifications.<sup>3</sup> During construction of the BTC Pipeline, BP and government representatives repeatedly assured investors and observers that elaborate security measures were in place to protect the line from attacks. For example, the route was deliberately

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<sup>1</sup> The oil pipeline carried only 440,000 bpd in May 2010 ("Iraq Kirkuk Oil . . .," 2010).

<sup>2</sup> A 2007 memorandum of understanding signed by Turkey and Iraq envisioned construction of a natural gas pipeline with a capacity of 10 bcm from five Iraqi gas fields, but apart from feasibility studies, practical work has yet to begin (BOTAS, 2010).

<sup>3</sup> Interviews with current and former U.S. officials, May–June 2010.

**Table 4.1**  
**Chronology of Energy Infrastructure Attacks in Turkey, 2004–2010**

Date	Location	Target Damaged	Method	Perpetrators
August 25, 2010	Agri	Natural gas pipeline	Explosion	PKK
August 10, 2010	Idil, Sirnak	Oil pipeline	Bombing	PKK
July 21, 2010	Dogubayazit, Agri	Natural gas pipeline	Explosion	PKK
July 3, 2010	Midyat, Mardin	Oil pipeline	Bombing	PKK
November 21, 2008	Midyat, Mardin	Oil pipeline	IED attack	PKK
August 5, 2008	Refahiye, Erzincan	Pipeline	Bombing	PKK
May 26, 2008	Agri	Pipeline	Bombing	PKK
August 19, 2006	Gecitalan, Agri	Natural gas pipeline	Bombing	PKK
May 31, 2006	Kozluk, Batman	Oil pipeline	IED attack	Unspecified
May 23, 2006	Dogubayazit, Agri	Gas pipeline	Bombing	Suspected PKK
June 15, 2005	Midyat, Mardin	Oil pipeline	Unspecified	PKK
May 30, 2005	Batman, Batman	Oil pipeline	IED attack	PKK
April 2, 2005	Besiri, Batman	Oil pipeline	Bombing	Unspecified
March 26, 2005	Taskoy, Mardin	Oil pipeline	Bombing	Suspected PKK
March 24, 2005	Midyat, Mardin	Oil pipeline	Sabotage	PKK
October 26, 2004	Batman	Oil pipeline	Bombing	Suspected PKK
October 26, 2004	Dovecik, Batman	Oil pipeline	Bombing	PKK
October 23, 2004	Batman	Oil pipeline	Bombing	PKK
September 20, 2004	Batman	Oil well	Unspecified	Unknown
September 19, 2004	Karaali, Diyarbakir	Oil tankers	Unspecified	PKK
August 10, 2004	Esenyurt, Istanbul	LNG storage facility	Bombing	Suspected PKK

SOURCE: National Counterterrorism Center, 2010.

chosen to avoid both southeast Turkey, where Turkey's Kurdish population is strongest, and Nagorno-Karabakh, and the entire pipeline was buried underground. State-of-the-art security was supposed to be in place at aboveground pumping stations and other potentially vulnerable sites.<sup>4</sup>

According to a private industry security assessment, the overall level of security inside Azerbaijan and Georgia is now significantly higher than in Turkey. BP, the pipeline operator in both Azerbaijan and Georgia, has heavily emphasized community participation and engagement in security arrangements. This is reinforced by frequent and intensive liaison with host-country security services. Aboveground sites, such as block valves, have been hardened since the August 2008 attack near Refahiye, and the Azerbaijan and Georgian sites are now protected by fences, video cameras, and private security guards who are recruited from the

<sup>4</sup> Interviews with energy industry representatives, June 2010.

local population and equipped with radios connected to command centers. In Georgia and Azerbaijan, local residents are also hired to conduct regular patrols and to report on the unexplained presence of strangers or other potential threats.<sup>5</sup>

In Turkey, the state-owned pipeline company, BOTAS, serves as the BTC Pipeline's in-country operator. Lead responsibility for protecting the BTC Pipeline in Turkey lies with the Jandarma (Gendarmerie), a national paramilitary organization jointly subordinated to the Interior Ministry and to the Ministry of Defense. This mission is merely a subset of the Jandarma's responsibility for policing rural areas. While there is reportedly good working rapport between the Jandarma and other Turkish security officials and the BTC Pipeline security representatives (many of whom are former active-duty members of the Jandarma or Turkish armed forces), the layers of security are reportedly thinner than in Georgia and Azerbaijan; and the level of local community involvement is far more limited.

Turkey's other major point of vulnerability is the Bosphorus, where a terrorist attack or tanker accident could have major political, economic, and environmental consequences. For some of the oil companies dependent on access to the strait, the worst-case scenario may not even be a tanker incident. According to one industry security expert, there is considerable concern about the potential consequences of a serious incident (whether an accident or a terrorist attack) involving a heavily loaded ship, for example, if a ship carrying scrap metal were to become immobilized in the Bosphorus.<sup>6</sup> Removing such a vessel would be cumbersome and time consuming. It is estimated that the process could take upwards of four months and completely close the Bosphorus to large ships. The industry security expert contrasted this type of incident with the effects of a serious tanker spill, which might lead to a month-long closure, albeit with potentially much greater environmental damage.

Upstream oil producers are likely to feel the ripple effects of a prolonged closure of the Bosphorus rather quickly. According to the industry security expert, any incident that forces the closure of the Bosphorus for more than ten days could force some upstream operators to begin shutting in (i.e., closing down) wells in Kazakhstan's north Caspian fields. Shutting in wells in Kazakhstan while extreme winter weather conditions prevailed could magnify the effects, delaying production schedules for up to a year.

Interstate conflict in the Caspian region also poses a limited threat to energy production and transit. The greater potential dangers arise from the so-called frozen conflicts.<sup>7</sup> For example, Azerbaijan is determined to regain some of the territory it lost to Armenia during the Nagorno-Karabakh war, which ended in 1994, and has used billions of dollars in oil revenues to finance large-scale military modernization. Even though renewed all-out war is not likely, the military balance in the region may shift as Azerbaijan acquires advanced weaponry, and even small-scale skirmishes could provide the trigger for a wider conflict.<sup>8</sup>

Another major regional conflict with the potential to interrupt energy flows is the long-running confrontation between Russia and Georgia. Energy pipeline infrastructure was not

<sup>5</sup> Interviews with energy industry representatives, June 2010.

<sup>6</sup> Interviews with energy industry representatives, June 2010.

<sup>7</sup> The term *frozen conflict* generally refers to an armed conflict that has ended in a stalemate or without a formal truce or treaty.

<sup>8</sup> In the worst incident in two years, four Armenian soldiers and one Azerbaijani soldier were killed along the front line in mid-June 2010, following an apparent incursion by Azerbaijani forces across the so-called "line of conflict" ("Armenian, Azerbaijani Clashes . . .," 2010).

damaged, and apparently not targeted, during the 2008 Russia-Georgian war, but flows from Azerbaijan and, to a lesser extent, Kazakhstan, were significantly disrupted. The BTC Pipeline was already out of service because of the apparent PKK attack near Refahiye, Turkey, which occurred just three days before the war began, and it remained closed throughout the conflict. Shipments along the parallel South Caucasus gas pipeline were also suspended as a precaution, an example of how conflicts in the region can have widespread ripple effects. Russian attacks on Georgian rail lines blocked oil shipments from both Azerbaijan and Kazakhstan to a Kazakh-owned oil terminal in the Georgian city of Batumi. As a precaution, BP closed the oil pipeline that connects Azerbaijan and the Georgian port of Supsa on the Black Sea. (The line was already closed for maintenance when the war started.) These shutdowns, while only temporary, effectively choked off 90 percent of Azerbaijan's oil export capacity during the conflict.<sup>9</sup>

Russia's restive North Caucasus region could pose a significant threat to vital energy infrastructure in the future. Islamic extremists operating in various parts of the North Caucasus have repeatedly mounted attacks on Russian security forces and civilian targets, including in the heart of Moscow. Militant attacks have damaged oil and gas pipelines (including the Baku-Novorossiysk line), as well as energy infrastructure targets. Most recently, militants launched an unsuccessful assault on a hydroelectric power plant in Kabardino-Balkaria in summer 2010 and a failed improvised explosive device (IED) sabotage attack on the main natural gas pipeline into Sochi, the site of the 2014 Winter Olympics.

Finally, tensions in the Caspian have also flared periodically from a demarcation dispute among the five littoral countries over maritime boundaries and division of the Caspian seabed. The dispute has not interfered with most offshore oil and gas development, particularly in the north Caspian. Russia and Iran have steadfastly opposed construction of underwater pipelines to carry Turkmenistan or Kazakhstan oil and gas to Azerbaijan, maintaining that any such efforts require the consent of all littoral countries (IEA, 2008). The situation has improved in recent years, thanks to a series of bilateral agreements among the north Caspian littoral countries (i.e., Russia, Kazakhstan, and Azerbaijan), but Azerbaijani-Iranian and Azerbaijani-Turkmenistani tensions remain unresolved. In one notable incident, Iranian military jets and a warship threatened Azerbaijani BP-owned and Azerbaijani research vessels operating in the contested Araz-Alov-Sharg offshore field in July 2001, which led to a freeze on exploration operations by one of the international consortia that are developing Azerbaijan's offshore fields ("Azerbaijan," 2010).

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<sup>9</sup> The only oil pipeline that remained in operation during the war was the Baku-Novorossiysk pipeline, a small Soviet-era line that bypasses Georgia and connects Baku and the Russian port of Novorossiysk on the Black Sea. Azerbaijani oil production was also exported via temporary swap arrangements with Iran (IEA, 2008, pp. 47–48).

## Current U.S. Energy Security Efforts

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### Caspian and Central Asia

The terrorist attacks on September 11, 2001, and the war in Afghanistan dramatically transformed U.S. interests in and policy toward the Caucasus and Central Asia. For the past nine years, defense and military cooperation has been the centerpiece of U.S. engagement with the countries of the region, facilitating access to important military bases and creation of an extensive logistics network. Yet the overriding focus on Afghanistan has led to the downgrading of other U.S. interests, a dynamic that has not been lost on U.S. partners in the region. As Azerbaijani Deputy Foreign Minister Araz Azimov aptly put it, “Our attitude is that Washington should stop thinking of Azerbaijan in terms of Afghanistan and start thinking of Azerbaijan in terms of Azerbaijan. The official attitude as enunciated by [P]resident [Aliyev] is, ‘We want respect’” (Goltz, 2010).

Compared with the massive scale of Afghanistan-related activities, the tools available for U.S. diplomatic and political engagement on energy security in the Caspian region are decidedly modest. The energy-producing countries in the Caspian have also placed limits on cooperation. These countries have found commercial ties with the United States or the EU useful for bolstering their independence, sovereignty, and regional standing, but not as a substitute for carefully calibrated relationships with the region’s leading powers, Russia, China, Turkey, and Iran. Another limiting factor is U.S. policymakers’ abiding belief that the private sector and market forces will largely determine how new energy transit routes from the Caspian are developed. Unlike China, the U.S. government is not able to mobilize the investment resources and support from the private sector that are required to build pipelines or to serve as the guarantor for multidecade off-take agreements (Morningstar, 2010a).

For the most part, the positive effects of U.S. diplomatic engagement have been felt on the margins. U.S. diplomacy has played a useful role in stimulating progress on resolution of regional disputes that have hurt the commercial viability of energy projects. For example, U.S. diplomats helped mediate the July 2009 Intergovernmental Agreement on Nabucco, which established the legal framework for transit pricing and tariffs, and a much-delayed June 2010 agreement between Azerbaijan and Turkey on the pricing for future gas shipments to Europe through Turkey.<sup>1</sup> As noted in Chapter Two, the latter agreement removed an important obstacle hindering progress toward the construction of the Nabucco Pipeline, opening the way for the BP-led Shah Deniz consortium to prepare for its decision on the most commercially attractive use of Azerbaijani gas.

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<sup>1</sup> Interviews with U.S. officials, May 2010.

DoD resources for cooperative security activities not directly related to Afghanistan are modest. With the notable exceptions of Georgia and Azerbaijan, there is relatively little appetite among the countries of the region for deeper security ties with the United States, to avoid angering either Russia or China. Military cooperation with Azerbaijan is limited by the provisions of the U.S. Freedom Support Act. Thus, bilateral cooperation in the Caspian region has focused on the low-key initiatives of border control, maritime patrol and coastal defense, counterterrorism, nonproliferation, and counternarcotics. While energy security is not a primary goal, it is a potential by-product of these missions.

In Azerbaijan, DoD assistance and cooperation have centered on maritime security within the Caspian Sea, where most new oil and gas development in Azerbaijan is occurring. These efforts include training and equipping maritime commando units; creating command and control centers; and providing communications, radar, and navigation systems for the Azerbaijani navy and coast guard.<sup>2</sup> DoD also installed two maritime radars in 2005 to enhance Azerbaijan's capability to monitor traffic in the Caspian and to detect threats to offshore oil and gas infrastructure from Iran or nonstate actors, along with other types of illicit activity ("Two Radar Stations . . .," 2005).

In Kazakhstan, attempts to kick-start cooperation after 2001 have had mixed results. Cooperation initially focused on training and equipment to strengthen the country's rapid-reaction capabilities to deal with attacks on energy infrastructure and facilities in the Caspian and counterterrorist missions. Kazakhstan's armed forces were equipped with surplus U.S. Huey helicopters, patrol boats, radios, and tactical gear. DoD also refurbished a naval academy located in Aktau, which is used to train and house the rapid-reaction force and other units. More-recent efforts have foundered, largely for bureaucratic reasons. For example, Kazakhstan's intelligence agency, the KNB, resisted the U.S. Defense Threat Reduction Agency's 2008 attempt to provide radars to improve Kazakhstan's maritime domain awareness. A similar attempt funded by U.S. Central Command's counternarcotics program to create a maritime operations center failed after the KNB insisted that the effort should be handled by the Kazakh border guards, who are subordinated to the KNB, not the Kazakh navy.

Isolationist Turkmenistan has not pursued a bilateral defense and military relationship with the United States. There are early indications that Turkmenistan is interested in expanding its coast guard and naval capabilities, and a fledgling dialogue with U.S. Central Command and the Department of State has begun on possible cooperative activities. Given Turkmenistan's penchant for neutrality and its close ties to Iran, a significant increase in bilateral activities seems unlikely.

## Turkey

Direct U.S. engagement with Turkey on energy security is fairly limited. Diplomatic ties and coordination are robust, but bilateral and multilateral defense efforts on energy are extremely limited and have been confined to informal senior leader and staff-level dialogue. One problem is that the Turkish military does not view energy security as part of its primary mission, leaving the issue in the hands of the domestic paramilitary police force, the Jandarma, which patrols rural areas. A related constraint is Turkey's sensitivity, in some cases unwarranted,

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<sup>2</sup> Interviews with U.S. officials, summer 2010.



about respect for its sovereignty.<sup>3</sup> The fact that the United States is not a signatory to the Montreux Convention, which governs transit rights and obligations through the Dardanelles and the Bosphorus, also might limit the degree of influence the United States can have on Turkish policy on transit between the Aegean and Black seas.

Although diplomatic cooperation on energy issues has been insulated historically from the ups and downs in the overall relationship, that cooperation may be harder to sustain in the coming months. Recent comments from U.S. policymakers have laid bare the strains caused by Turkey's no vote on the Iranian nuclear sanctions resolution and Turkey's reaction to Israel's raid against the flotilla carrying aid to Gaza. Assistant Secretary of State for European and Eurasian Affairs Philip Gordon issued a blunt warning that Turkey's continued commitment to NATO, Europe, and the United States "needs to be demonstrated."<sup>4</sup>

Several sensitive issues could complicate Ankara's relations with both Washington and Brussels over the near term. For example, Ankara's ties with Iran continue to carry significant risks for both sides, especially if Turkey decides to challenge U.S.- and EU-backed sanctions aimed at curbing foreign investment in the Iranian energy sector. Another major test of U.S.-Turkish relations will come with the annual congressional debate on the Armenian genocide resolution. While it is too early to predict the outcome of the debate, Turkey's behavior on Iran and the Arab-Israeli conflict could increase congressional support for the resolution. Passage of the resolution is likely to have a chilling effect on bilateral defense and military cooperation, possibly including denying or limiting U.S. access to the air base at Incirlik.<sup>5</sup>

One element of U.S.-Turkish cooperation offers promise of continuing military relations. Since autumn 2007, the U.S.-Turkish relationship has been bolstered by extensive military and intelligence cooperation on the PKK terrorist threat. The real-time intelligence support that the U.S. military has been providing Turkey has been crucial to the effectiveness of Turkish attacks on PKK redoubts in Northern Iraq (Larrabee, 2010). With the PKK's 14-month ceasefire at an end and PKK violence on rise, this uniquely successful program will only become more important to Ankara. It also may provide a valuable foundation for increased USAF collaboration with Turkey on energy security. Crucially, many of the institutional ties and relationships that have developed between USAF and Turkish military personnel might be brought to bear on joint energy security efforts in the future.

<sup>3</sup> These concerns are reflected in the strong restrictions on the U.S. presence at Incirlik. The base remains under the command of the Turkish military. The Turks have allowed the United States to use the base as a transport hub to fly troops and material to Iraq and Afghanistan. However, the Turks have refused to allow the United States to permanently station aircraft on Turkish soil and have imposed strict restrictions on sorties flown out of Incirlik (U.S. Air Force, 2008).

<sup>4</sup> According to Gordon,

There is a lot of questioning going on about Turkey's orientation and its ongoing commitment to strategic partnership with the United States. Turkey, as a NATO ally and a strong partner of the United States not only didn't abstain but voted no [on the Iranian sanctions resolution], and I think that Americans haven't understood why. (Butler, 2010)

<sup>5</sup> Ambassador Daniel Fried testified before Congress in March 2007 about the possible effects of passage of the Armenia genocide resolution. According to Fried, "They could, for example, shut down or curtail operations at Incirlik; they could slow down traffic at the harbor gate [in northern Iraq]; they could restrict our over-flight rights; they could do so wholly, they could do so in part." (Fried, 2007.)





## Potential U.S. Air Force Roles

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The future involvement of USAF on energy security issues in the Caspian and Turkey region will largely be based on the types of threats to energy infrastructure that prospective partners face and their level of interest in deeper engagement with the United States. In the Caspian basin, any major expansion of bilateral defense and military cooperation is unlikely because of the relatively benign security environment and the inhibiting effects of Russia's, Iran's, and China's unease about the U.S. military presence in the region. Such partners as Kazakhstan or Turkmenistan are likely to remain reticent about the potential expansion of cooperative activities, lest they invite unwelcome attention from Russia and China. Azerbaijan represents an important potential exception. However, congressional restrictions on military ties with Azerbaijan will be a major impediment to greater USAF involvement that is unlikely to diminish absent a diplomatic breakthrough on Nagorno-Karabakh. At this point, we have no evidence that such a breakthrough is likely.

The most successful DoD efforts with Caspian energy-producing countries have focused on maritime missions and the development of rapid-response capabilities. Over time, there may be opportunities for deeper engagement of U.S. forces as indigenous forces mature and improve. We do not see energy security considerations as providing an opening for USAF-led engagement in the Caspian's energy-exporting nations. Neither have we identified emerging issues in these countries in which USAF platforms and expertise would be particularly effective tools for building partnership capacity centered on energy security issues.

The situation is different in Turkey, which wants to become an energy crossroads yet has been slow to come to grips with the practical implications of this goal for the country's national security requirements. Meanwhile, neutralizing the PKK terrorist threat and preventing a disastrous oil spill in the Bosphorus will continue to command high-level attention in Ankara. Cooperation and dialogue on these issues under the rubric of energy security could be a useful tool for aligning the United States more closely with Turkey's national security priorities.

For example, it is increasingly clear that Turkey will need to build new infrastructure to secure its goal of becoming a key transit state. Regardless of which combination of pipeline projects ultimately brings Caspian and Middle East gas to Europe via Turkey, any investment decision will consider Turkey's ability to respond to that project's security needs. As discussed in Chapter Four, Turkey's current capabilities for protecting domestic energy infrastructure remain uncertain, although the country certainly has the resources to enhance that capability.

While pipeline security is now the responsibility of the Jandarma, the Turkish government is reportedly beginning to seek greater contributions from the Turkish military's intelligence, surveillance, and reconnaissance platforms and rapid response capabilities to help secure

energy infrastructure, including pipelines and transit through the Bosphorus.<sup>1</sup> Meanwhile, we anticipate that there will be opportunities for interactions with, on one side, the Turkish military and government agencies, including the Jandarma, that have stakes in infrastructure protection and, on the other side, the U.S. DoD and U.S. government agencies with expertise and capabilities in energy infrastructure protection.

Another energy-related topic for strengthening the USAF relationship with Turkey centers on Turkish fears of a large oil spill in the Bosphorus or along Turkey's Black Sea and Mediterranean coasts. Considering how much the Deepwater Horizon disaster has galvanized the concerns of senior Turkish officials and business leaders, there may now be a unique opportunity to help Turkey grapple with the challenge of strengthening its crisis capabilities for responding to oil spills and terrorist attacks in the Bosphorus.<sup>2</sup> A lessons-learned seminar that exposes Turkish counterparts to U.S. officials and private industry representatives with first-hand experience in responding to oil spills would likely garner considerable interest. Alternatively, a USAF-sponsored Building Partner Capacity seminar could examine the relevance to Turkey of specific components of the emergency response in the Gulf of Mexico, such as coordination of local, federal, military, and private-sector efforts during disaster relief, and could also include a tabletop exercise. The events in the Gulf of Mexico could be added to the agenda for the USAF's annual strategy conference and also could form the basis for bilateral or multilateral exercises focused on a terrorist attack or environmental event in the Black Sea or Bosphorus.

Considering Turkey's long-standing concerns with sovereignty, its state of economic development, and its existing security assets and capabilities, we have purposely limited our recommendations to fairly modest activities: jointly convened conferences and, possibly, low-level military exercises directed at energy infrastructure protection or energy-related emergency response associated with a terrorist attack on energy infrastructure or a major oil spill. Moreover, these modest partnership-building activities appear consistent with the overall direction now being taken by U.S. European Command and the U.S. Department of State in strengthening the U.S. relationship with Turkey.

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<sup>1</sup> The Turkish press has reported that officials from Turkey's Energy and Interior ministries have discussed the use of unmanned aircraft patrols to boost pipeline security following the summer 2010 surge in PKK attacks ("Unmanned Aircrafts . . .," 2010).

<sup>2</sup> While the technical challenges of capping a subsea blowout are quite different from those of a tanker spill, both require a strong, coordinated response involving multiple agencies at multiple levels of government.

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